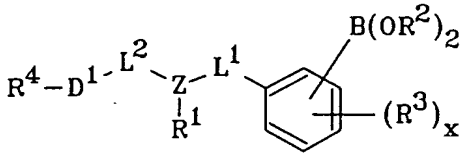
WHAT IS CLAIMED IS:

1. An implantable amplification system comprising a polymer matrix and amplification components contained in said matrix, said components producing a polyhydroxylated analyte signal upon interrogation by an optical system, wherein said amplification components do not require resonance energy transfer for production of said signal and comprise a compound of the formula:



(I)

wherein,

D^1 is a dye selected from the group consisting of fluorescent dyes, luminescent dyes and colorimetric dyes;

R^1, R^3 and R^4 are each independently substituents which alter the electronic properties of the groups to which they are attached or are functional groups which can form covalent linkages to the surrounding polymer matrix;

each R^2 is a member independently selected from the group consisting of hydrogen and C_1-C_4 alkyl, or taken together the two R^2 groups form a C_2-C_5 alkylene chain;

each of L^1 and L^2 is a linking group having from zero to four contiguous atoms selected from the group consisting of carbon, oxygen, nitrogen, sulfur and phosphorus;

Z is a heteroatom selected from the group consisting of nitrogen, sulfur, oxygen and phosphorus; and

x is an integer of from zero to four.

2. An implantable amplification system in accordance with claim 1, wherein said polymer matrix is a biocompatible polymer matrix.

3. An implantable amplification system in accordance with claim 1, wherein R^1, R^3 and R^4 are each members independently selected from the group consisting of hydrogen, hydroxy, acyl, C_1-C_4 alkoxy, halogen, thiol, sulfonic acid, sulfonamide, sulfinic acid, nitro, cyano, carboxylic acid, a C_1-C_{12} alkyl group, a substituted C_1-C_{12} alkyl group, a C_1-C_{12} alkenyl group, a substituted C_1-C_{12} alkenyl group, a C_1-C_{12} alkynyl group, a substituted C_1-C_{12} alkynyl group, aryl, substituted aryl, arylalkyl, substituted arylalkyl, amine, and substituted amine, wherein said substituents are selected from the group consisting of hydroxy, acyl, aryl, C_1-C_4 alkoxy, halogen, thiol, sulfonic acid, amines, sulfonamide, sulfinic acid, nitro, cyano, carboxamide and carboxylic acid.

4. An implantable amplification system in accordance with claim 1, wherein D^1 is a long wavelength fluorescent dye having an emission wavelength of at least about 450 nm.

5. An implantable amplification system in accordance with claim 1, wherein D^1 is a short wavelength fluorescent dye having an emission wavelength of from about 320 to about 450 nm.

6. An implantable amplification system in accordance with claim 4, further comprising a detectable calibration fluorophore contained in said matrix, said calibration fluorophore providing a second signal which does not interfere with the signal produced by said compound.

7. An implantable amplification system in accordance with claim 1, wherein D^1 is selected from the group consisting of fluoresceins, coumarins, oxazines, xanthenes, cyanines, metal complexes and polyaromatic hydrocarbons which produce a fluorescent signal.

8. An implantable amplification system in accordance with claim 1, wherein said compound is covalently attached to said polymer matrix.

9. An implantable amplification system in accordance with claim 8, wherein said covalent attachment is made through a functional group present in R^1.

10. An implantable amplification system in accordance with claim 8, wherein said covalent attachment is made through a functional group present in R^3.

11. An implantable amplification system in accordance with claim 8, wherein said covalent attachment is made through a functional group present in R^4.

12. An implantable amplification system in accordance with claim 1, wherein said polymer matrix comprises a polymer prepared from a reaction mixture of:

(a) a diisocyanate, said diisocyanate comprising about 50 mol% of the reactants in said mixture;

(b) a hydrophilic polymer which is a member selected from the group consisting of a hydrophilic polymer diol, a hydrophilic polymer diamine and combinations thereof;

(c) a siloxane polymer having amino, hydroxyl or carboxylic acid functional groups at the chain termini.

13. An implantable amplification system in accordance with claim 12, wherein said polymer matrix further comprises an outer hydrogel coating, wherein said hydrogel is formed from a reaction mixture of:

(a) a diisocyanate, said diisocyanate comprising about 50 mol% of the reactants in said mixture;

(b) a hydrophilic polymer which is a member selected from the group consisting of a hydrophilic polymer diol, a hydrophilic polymer diamine and combinations thereof; and optionally;

(c) a chain extender,

said hydrogel having a water pickup of from about 120% to about 400% by weight.

14. A method for quantifying the amount of a polyhydroxylated analyte in an individual, said method comprising:

(a) interrogating a subcutaneously implanted amplification system of claim 1 with

an energy source to provide an excited amplification system which produces an energy emission corresponding to said amount of said polyhydroxylated analyte; and

(b) detecting said emission to thereby quantify the amount of said polyhydroxylated analyte in said individual.

15. A method in accordance with claim 14, wherein said energy source is a laser diode, LED or other optical source.

16. A method in accordance with claim 14, wherein said polyhydroxylated analyte is glucose.

17. A method in accordance with claim 14, wherein D^1 is a long wavelength fluorescent dye having an emission wavelength of at least about 450 nm.

18. A method in accordance with claim 17, wherein said amplification system further comprises a detectable calibration fluorophore contained in said matrix, said calibration fluorophore providing a second signal which does not interfere with the signal produced by said compound.

19. A method in accordance with claim 14, wherein D^1 is selected from the group consisting of fluorescein, coumarins, oxazines, xanthenes, cyanines, metal complexes and polyaromatic hydrocarbons which produce a fluorescent signal.

20. A method in accordance with claim 14, wherein said compound is covalently attached to said polymer matrix.

21. A method in accordance with claim 14, wherein said polymer matrix comprises a polymer prepared from a reaction mixture of:

(a) a diisocyanate, said diisocyanate comprising about 50 mol% of the reactants in said mixture;

(b) a hydrophilic polymer which is a member selected from the group consisting of a hydrophilic polymer diol, a hydrophilic polymer diamine and combinations thereof;

(c) a siloxane polymer having amino, hydroxyl or carboxylic acid functional groups at the chain termini.

22. A method in accordance with claim 21, wherein said polymer matrix further comprises an outer hydrogel coating, wherein said hydrogel is formed from a reaction mixture of:

(a) a diisocyanate, said diisocyanate comprising about 50 mol% of the reactants in said mixture;

(b) a hydrophilic polymer which is a member selected from the group consisting of a hydrophilic polymer diol, a hydrophilic polymer diamine and combinations thereof; and optionally;

(c) a chain extender,

said hydrogel having a water pickup of from about 120% to about 400% by weight.

23. A biosensor for measuring the amount of a polyhydroxylated analyte *in vivo*, said sensor comprising:

(a) an implantable amplification system of claim 1 comprising a biocompatible polymer matrix and amplification components contained therein which produce a polyhydroxylated analyte signal upon interrogation by an optical source, wherein said amplification components do not require resonance energy transfer for production of said signal and wherein said signal corresponds to said amount of said polyhydroxylated analyte; and

(b) an optical system comprising said optical source and a detector which detects said signal thereby measuring the *in vivo* amounts of said analyte.

24. A biosensor in accordance with claim 23, wherein said optical source is a LED, laser diode or other light source.

25. A biosensor in accordance with claim 23, wherein said optical system further comprises at least one filter and wherein said optical source is a LED.

26. A biosensor in accordance with claim 23, wherein said detector comprises

a diode array spectrometer.

27. A biosensor in accordance with claim 23, wherein said optical system comprises a fiber optic.

28. A biosensor in accordance with claim 27, wherein said amplification system is at the terminus of said fiber optic.

29. A biosensor in accordance with claim 23, wherein said optical system is coated with a sterile biocompatible polymer and can be implanted subcutaneously in an individual.

30. A biosensor in accordance with claim 23, wherein said optical source is coated with a sterile biocompatible polymer and can be implanted subcutaneously in an individual.

31. A biosensor in accordance with claim 23, further comprising an insulin pump which is activated by a signal from said detector, wherein said optical system and said insulin pump are coated with a sterile biocompatible polymer, and can be implanted subcutaneously in an individual.